



# **The knowledge of Ebola virus disease among nursing students.**

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<p>Description.</p> <p>Ebola virus disease is a viral infection among humans with a fatality rate of up to 90%. The largest outbreak of the diseases was recorded in October 2014. This involved more than 10,100 cases mainly in West Africa. Nurses, doctors and other healthcare workers were on the forefront to fight the disease. Nurses having a big role in the fight of the disease need to be well educated about the disease.</p> <p>The purpose of this study was to find out the knowledge of nursing students on Ebola virus disease. This was focused on providing information to improve the content of education in nursing schools and a basis for further research.</p> <p>A qualitative research approach was applied. Data was collected from fifteen students. Open ended questionnaires were used to yield detailed response from the students. The results were analyzed by inductive analysis method.</p> <p>The findings suggested that the students had a general idea about Ebola virus disease. However, there were gaps in their knowledge concerning the causes, modes of transmission, prevention methods and the symptoms of the disease. The students expressed their wish to study and get more educated on the subject.</p>		

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## **Introduction**

Ebola virus disease (EVD) is an acute, viral and fatal illness among humans. It can be transmitted from wild animals to human and could spread from human to human (WHO, 2016). EVD was first discovered in 1976 in Ebola River in the Democratic Republic of Congo (Centre of Disease Control and Prevention, 2014). This spellbound virologists, epidemiologists and clinicians because of its high fatality rate 25%-90% and transmissibility (Ebola virus disease, 2015). Its geographical limitation was an advantage since the disease was contained and its spread was controlled accordingly. Few outbreaks were reported later but were silenced by the quick action of the medics who were able to manage it. The need for a vaccine was also established but the target population for the researchers was limited (Levine, Tapia, Hill & Sow 2014, 2).

As of 25<sup>th</sup> of October 2014, more than 10,100 cases had been reported in Sierra Leone, Guinea, Liberia, Senegal, Nigeria and Mali. This was considered the largest outbreak of Ebola Virus Disease. Possible global spread was expected as few people were found to be affected with the same disease in Spain and United States (Schieffelin et al. 2014). There was great concern about the possibility of the spread of the disease to the rest of the world. Passengers from West Africa were screened in most countries. In United States, it was suggested to ban travelers from West Africa (Ebola: US restrict airport arrivals from West Africa, 2014).

The aim of this study was to find out what nursing students in a city in Finland know about Ebola virus disease. This will provide information to improve the content of education among nursing students on tropical diseases and a basis for more research to be carried out on this specific topic.

Research question: What is JAMK University of Applied Sciences nursing students' knowledge on Ebola virus disease about symptoms, causes and modes of transmission?

## **1 General Overview of EVD**

### **1.1 Statistics and etiology**

The most recent EVD disaster affected mainly Sierra Leone, Liberia and Guinea in West Africa. Approximately 27,000 cases and 11,000 deaths were reported by the World Health Organization (NHS, 2015).

The spread of Ebola disease throughout West Africa was still increasing as of October 2014. Being the largest epidemic of Ebola reported, it had affected a big population. This included 3000 Ebola cases and 1,500 deaths confirmed in Guinea, Liberia and Sierra Leone. Later on, another outbreak was reported in the Democratic Republic of Congo. There were more than 4,800 deaths due to EVD in West Africa; Liberia being the most affected. Approximately 50 new cases were reported on a daily basis in the capital of Monrovia during the outbreak. Until the 9<sup>th</sup> of November 2014, there were 5,160 confirmed, probable and suspected deaths; 2,836 in Liberia, 1,169 Sierra Leone, 1,142 in Guinea and 8 in Nigeria. In the US and Senegal, one case was confirmed in each of the countries. After the treatment of two missionaries who died because of EVD in Madrid, a Spanish nurse was the first EVD patient outside West Africa. The figure below shows the spread of EVD deaths since 1976 reported by WHO, HPA and CDC (Ebola: Mapping the outbreak, 2016).

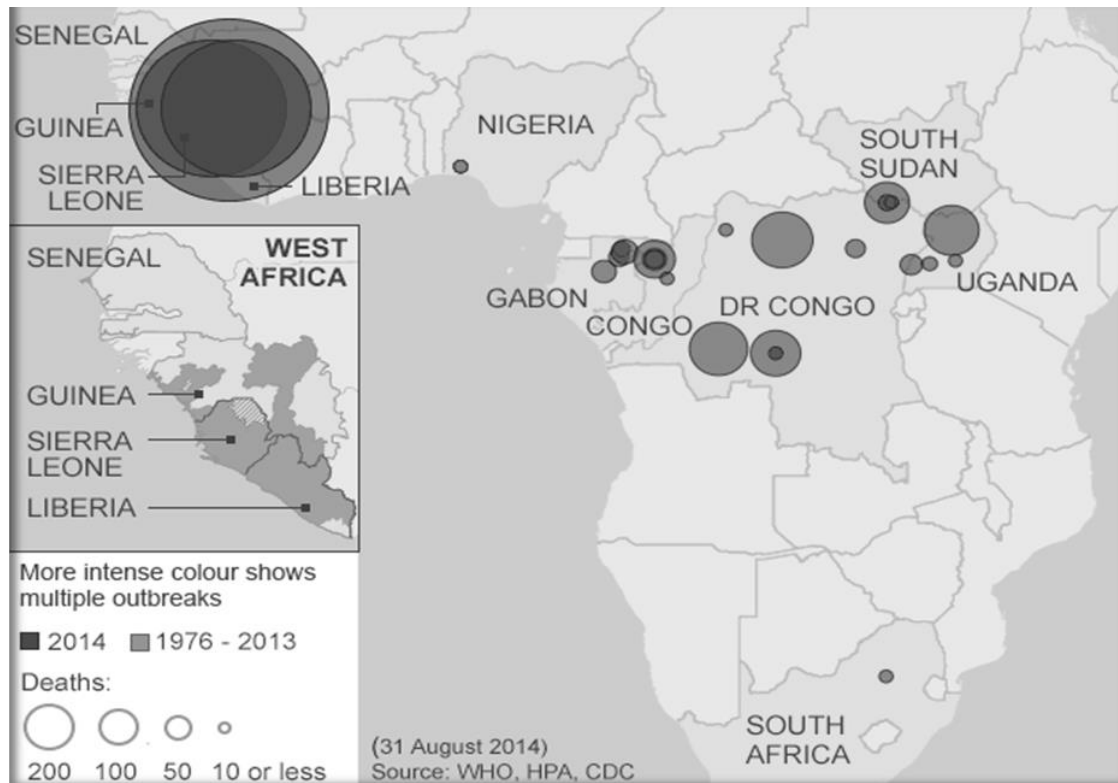


Figure 1, Ebola Virus deaths since 1979 (Why Ebola is so dangerous, 2014)

## 1.2 Mode of transmission

Humans can be infected by EVD through broken skin or mucus membrane in eyes, nose or mouth. Contact with body fluids like blood, infected urine, sweat, saliva, feces, semen and breast milk can also cause the spread of the virus. Coming in contact with sharp objects previously used by EVD patients is also a risk. Human contact with infected fruit bats or primates; apes and monkeys can cause the spread of EVD. It should be noted that Ebola is not spread through water, air or food. In Africa, there were confirmed cases of people who contracted EVD by handling bush meat and infected bats. It has been proved that insects like mosquitoes cannot transmit the virus. The only species affected include humans, apes, bats and monkeys. When a patient recovers, the disease cannot be spread to the unaffected population. However, it is different with

men since Ebola can stay in semen after recovery. Abstinence from sex for at least three months is advised. Oral sex should also be avoided at the same time. Condoms should be used if abstinence is impossible. There have been no cases of sexual transmission (Centre of Disease Control and Prevention, 2014.). According to Oxford University (2016), the life cycle of Ebola virus and its mode of entry to the human body is unknown. It has been suggested that human contact with an infected animal can spread the infection. Later on, this can be transmitted from human to human.

### **1.3 Epidemiology**

EVD is a member of Filoviridae virus family. The filoviruses are RNA viruses that cause hemorrhagic fever. The case fatality rate in human beings is up to 90%. The first occurrence of the virus was recorded in the Democratic Republic of Congo. 21 more outbreaks were reported after that. In Uganda, 425 cases were reported with 216 of which were confirmed by laboratory tests in 2000 to 2001. The fatality rate was 53%. In West Africa (Guinea, Sierra Leone and Liberia), it was reported that the fatality rate of EVD was 90% in the 2013 outbreak. This was an international public health emergency since there were 5740 cases in Guinea, 9890 in Liberia and 5 000 in Sierra Leone as of November 2<sup>nd</sup> 2014. There has been a big change in the epidemiology of EVD in the countries affected since the most recent outbreak. Data collected in West Africa between March 2014 and May 2015 revealed that there were 14913 confirmed, 2081 probable and 9099 suspected cases with 11005 deaths. However, a decreasing trend has been observed since the beginning of the outbreak. A decrease of 92.13% in Guinea and 97.70% in Sierra Leone, and no new cases reported in Liberia was observed between October 2014 and January 2015. There was also a decline in

the mortality rate due to the improved healthcare and international aid (Wang, 2015, 52-53; Moghadam, Omid, Bayrami & SeyedAlinaghi, 2015).

#### **1.4 Challenges involved in EVD management.**

Some health care workers became infected with EVD while treating their patients. This was due to close contact with the patients since the strict precautions were not put into practice. Mourners at the burial also contracted EVD due to the direct contact with the deceased person (Centre of Disease Control and Prevention, 2014). There is a great risk in controlling the disease that involves the collection of dead bodies and isolating the patients. Any physical contact with the affected person was considered as a death sentence since the disease is highly contagious. Medical staff involved in the fight against Ebola is the most at risk. Use of personal protective equipment, isolation and safe burial are the measures that were being undertaken. Some health care workers were reluctant to take part in the fight against EVD. The management of the disease was a challenge; it was demanding and the health workers were in short supply of better PPEs. In the Ebola hit region, nurses and doctors had died during the process including Sheik Umar Khan who was the only virologist in Sierra Leone (Ebola Virus: Film reveals scenes of horror in Liberia, 2014.)

#### **1.5 Perception and knowledge EVD in different parts of the world**

In United States, the Ebola outbreak was a great threat to the public and policy makers. It was noted that Americans overestimated the chances of contracting the disease even though it was almost impossible for the country



to be affected. It was noted that the reason why the Americans overestimated the chances of contracting the disease was also due to psychological science of perception related to peoples' beliefs (mental model) pertaining the mode of transmission, lethality, and the epidemiology among other factors. Since the ultimate outcome of the disease was death at that time, there was a higher probability of the population to dread it more than other milder diseases. There was a concern by the public health officials, the state and the federal in US to provide information on the true value of the chances of contracting EVD. Some information about the deadliness and gruesomeness of the symptoms was withheld to reduce fear among the public. It's suggested that the public health officials should take responsibility of informing the public on the true state of the situation. The informants should also take into account and understand peoples' beliefs so that it is not only the health workers who have the real picture of the crisis. This will help the public to understand the crisis and challenges involved in providing effective response to the situation (Carman, Pollard & Parker, 2015.)

Rübsamen and co-workers (2015) investigated risk perceptions in Germany. The questionnaire investigated the risk perceptions of EVD, knowledge about transmission routes, usage of media, reactions to the outbreak, attitudes towards prevention measures, vaccination and willingness to volunteer for aid missions. The study showed that the risk misperceptions can lead to stigmatization of those perceived as sources of infection. According to the study, a common misperception was airborne transmission and usage of public transportation was considered possible to acquire EVD. If a patient suffering from EVD would have been flown to a hospital in Germany, possible behavior changes of the participants included increased hygiene behavior and not visiting a friend admitted to the same hospital with EVD

patient. Furthermore, most of the participants would not only cancel their flight to affected countries, but also to un-affected African countries. According to the study, misperceptions of the transmission modes were common and it could trigger inappropriate behavior changes. In addition, the participants that used media were more likely to be worried away than those who did not (Rübsamen, Castell, Horn, Karch, Ott, Raupach-Rosin, Zoch, Krause & Mikolajczyk, 2015).

A study performed in November 2014 to February 2014 among Australian Pilgrims who returned home from Hajj in October 2014 showed that the pilgrims who had received EVD travel advice were more informed than those who didn't. However, 40% of them had no accurate information on the mode of transmission. The younger and more educated were found to be more knowledgeable than the rest. Pre-travel health care advice was given and yielded positive results among the people who attended it: precautions were practiced to reduce the risk factors of contracting the disease (Alqahtani, BinDhim, Booy, Heywood, Rashid, Tashani, Wiley & Willaby. 2014.) In the beginning of the 2014 outbreak, some Liberians believed that EVD is an evil spirit, poisoning or a devil. Later they realized that it was a real disease. A Liberian musician named Charles Yegba composed a song: take away the fear, don't hide yourself, people can survive from Ebola. Being one of the people who did not believe that EVD exists, he composed the song to create awareness and hope for the affected people during the outbreak. In the lyrics, he stated the symptoms of the disease and advised people to go to the health care centers for medical intervention and disease containment. It suggested that education and communication is very important for people to understand what EVD is, the mode of transmission and the protection measures to be undertaken, Liberia (Spreading the word about Ebola through music, 2015). Marmon (2014), states that the real fear of EVD was in Pan-Africa. As the Africans were internalizing the problem, the rest of the

world believed that it is an African issue. Zambia, South Africa, Kenya, Namibia and Botswana imposed restrictions on travelers from the affected countries. There were many flights and resorts cancellations in the affected parts of the continent. Travelling in African countries was a big challenge due to these restrictions.

While physical contact is a big concern in spreading of the Ebola disease, religious practices including very close contacts with the dead patients caused a double concern in this regard. For example, in Liberia and Sierra Leone, ritual preparation of cadavers for burial includes washing, touching and kissing. Moreover, shaving the head of men and braiding the hair of women is included in this practice. In this regard, the people of high status in the society are asked to take part in preparation. As bleeding happens prior to death in Ebola disease, the body will have a high load of viral so those who are in direct contact with the body during the funeral practices are in great risk of being infected. In this regard, MFS has tried to make people aware of how dangerous is to approach a dead body, (Why Ebola is so dangerous, 2014.)

## **1.6 Knowledge of EVD among health care workers**

A study carried out in India in 2015, concluded that dentists' knowledge about the EVD was good. Respondents from urban areas and higher qualifications were more knowledgeable than the rest. However they still had knowledge gaps in subjects regarding preventive measures, symptoms, treatment, diagnostics and elimination of the disease (Gupta, Mehta, Gupta, Arora & Setia 2015). A research performed in the Yangon University of nursing, showed that most nursing students received their knowledge about EVD through media; TV, radio, internet searches and peer groups. 54.7% of the nursing students had

good knowledge about the disease (Aung, Myint, Lynn & Mya, 2015). This implied that there is a need to improve education delivery among nursing students to ensure that they are well educated about the EVD. A significant relationship between the knowledge and perception of EVD was also observed among the students. The more knowledge the students had, the more positive their perception about EVD was. With a positive perception, there was more involvement in the curative and preventive measures as directed by the communities and hospitals. This implies that nurses should be educated about emerging disease like EVD to reduce misconception, change the negative perception and improve the willingness of nurses to participate in disease control activities (Aung et al, 2015). Brand, Siela, Caine and Dearth (2014) suggest that since the treatment and preventive measures of EVD are still being researched on, nurses and other health practitioners should aim at being vigilant and acquiring knowledge about its epidemiology, symptoms, prevention and spread.

Another study was conducted in Nigeria's tertiary hospital about knowledge, perception and practice of health workers towards Ebola Virus Disease. (Olowookere, Abioye-Kuteyi, Adepoju, Esan, Adeolu, Adeoye, Adepoju & Aderogba, 2015). According to Olowookere and co-workers (2015) Health workers are more vulnerable to EVD than the general population. 400 health workers participated in semi structured questionnaire that explored participant's general knowledge, emergency preparedness, control and management of EVD. 52,2% of the participants were nurses. As a result, there seemed to be a gap in knowledge and poor infection control preparedness among the respondents. Ebola was seen to be too far away to be a threat. The kind of perception towards not only EVD, but towards any infectious disease could result as uncontrollable epidemics. Also the health care workers were seen as a source of spread towards their families, coworkers and community when dealing with infected patients. In conclusion, continuous medical education on universal precautions

should target all the healthcare workers. In addition, the study showed that control policy and emergency preparedness towards possible Ebola epidemic was needed. (Olowookere et al, 2015).

## **2 Aims, purpose and research questions of the study**

The aim of this study was to find out what nursing students in a city in Finland know about Ebola virus disease. This will provide information to improve the content of education among nursing students on tropical diseases and a basis for more research to be carried out on this specific topic.

Research question: What is JAMK University of Applied Sciences nursing students' knowledge on Ebola virus disease about symptoms, causes and modes of transmission?

## **3 Implementation of the research**

### **3.1 Research methodology**

A qualitative research method was used to achieve the aim of this study. According to Richie and Lewis (2003, 2-3), a qualitative research is a research that does not indicate values but instead uses data and it locates the observer in the world. It transforms the world into a sequence of representations that includes but not limited to interviews, note taking, conversations, recordings, memos to oneself, etc. It is concerned with understanding the meanings people attach to happenings (actions, decisions, values, beliefs, etc.) within their social worlds. This study about Ebola focuses on exploring students' knowledge about particular health issue. Furthermore, in nursing, qualitative research is becoming increasingly important as a way of developing knowledge for evidence-based

nursing practice. It is because qualitative research provides answers to nursing's concern related to human responses to actual or potential health problems (Qualitative research in nursing, 2013). A qualitative research's main aim is to generate words instead of numbers (Brikci & Green 2007, 2). This study explores students' knowledge about EVD, how they answer to some open-ended questions connected with the disease, but does not focus on generating numbers and statistics. The students involved will have no limitation to information delivery.

Since this study aims at finding out the knowledge of nursing students on EVD in JAMK University of Applied Sciences, a qualitative research methodology is appropriate method. Students representing different countries and cultures are taking part in the study to provide in depth information of their understanding about the disease.

### **3.2 Setting**

The institution that hosted our project is the school of health and social studies of JAMK University of Applied Sciences. This project happened at the department of nursing and health care among participants from the international nursing program. The program of nursing at JAMK educates registered nurses who are able to plan, implement and develop nursing practice in a multi professional healthcare team. JAMK's nursing students are trained to be able to promote health, prevent diseases, and provide care, support guidance and rehabilitation in their future working life. (JAMK information, 2015.) International students were the potential participants since they originate from all over the world.

### 3.3 Recruitment of participants

When conducting a qualitative research, subjects are selected on the basis of criteria that are set by the researcher (Saaranen-Kauppinen & Puusniekka, 2006). This group of students was chosen by the researchers' predetermination. Sargeant (2012) describes the subject selection process in qualitative research to be purposeful as he describes the process: "Participants are selected who can best inform the research questions and enhance understanding of the phenomenon under study. Decisions regarding selection are based on the research questions, theoretical perspectives, and evidence informing the study". (Sargeant, 2012). This study follows these basic guidelines as well.

Participants were first year international nursing degree students from JAMK University of Applied Sciences. Students representing different nationalities offered information from different perspectives. Fifteen students were selected voluntarily to participate in the research. There were no inclusion and exclusion criteria for the study. Students were asked to fill a questionnaire after getting permission from the lecturer. They were assured that the information would be confidential. Ideally, the participants would be eager to participate in the research. (Saaranen-Kauppinen & Puusniekka, 2006).

When the time of collecting data is limited, it is recommended that the researchers are in close contact and in site for easier recruitment of respondents, (Mack, Woodsong, MacQueen, Guest & Namey, 2011, 7). In this regard, the respondents and the researchers study in the same institution.

### 3.4 Data collection

Data collection was conducted during one of the respondents' lectures. Permission was granted by the lecturer to hand out the questionnaires to the students. An introduction of the study was done verbally by the researchers in the lecture room. It was also announced that the participation to the study was optional and voluntary. Those who were willing to participate were educated on how to answer the questions to avoid ambiguity and cheating. Fifteen volunteers participated in the study.

Questionnaires are appropriate for collecting data about people's knowledge, attitude and feelings, (Siniscalco et al. 2013, 3-4). Paper printed questionnaires were used since the target group was readily available. Paper survey was used for the researchers' convenience, time saving and to reduce costs. Snapsurveys, (2016) suggests that the advantages of paper survey include; high speed of response and increased response rate.

To identify the knowledge of EVD, spontaneous and detailed answers were expected from the students. To achieve this, open ended questions were used to allow the students to have an expression of their ideas in details with no limitation. Open-ended questions draw out answers which the interviewer cannot anticipate and are usually lengthier. They also provide the researchers with some unexpected aspects of the issue, (Maggi 2010, 98; Pew Research Center, 2016). Limitless expression of the respondents using open ended questions is not influenced by the researcher and thus there is high possibility of spontaneous discovery of ideas and avoidance of biasness as in closed ended questions (Reja, Manfreda, Hlebec, Vehovar , 2003).



### 3.5 Data Analysis

To analyze data inductive approach was used. The inductive approach is a set of procedures used to analyze qualitative data in a way that theory, concepts, terms are derived from detailed readings of collected raw data. Contrary to deductive analysis, in the use of inductive approach there are no prior theories, hypotheses or assumptions made by researcher that influence the approach to gather data. In inductive approach the researcher looks for core meanings emerging from the data. As outcomes of analysis there are identified and broadly described themes or categories most relevant to research objectives. The recommended way of writing the findings is by deriving names of main headings from top-level categories. Additionally, the categories ought to be described comprehensively as well as supported by suitable quotations from the collected data, (Thomas 2006,238-242.)

In this study, there were no prior assumptions, hypotheses or theories that could have an impact on gathering data. Firstly, raw data was collected and secondly, theory in a systematic way emerged from the data. It is characteristic for general inductive approach. The analysis was carried out first by multiple readings, considering possible meanings and identifying lower-level themes and categories. Identified themes are: "What is Ebola", "protection", "modes of transmission", "causes", "symptoms", "do you need further information", "challenges", "going to Africa". Later on lower-level themes and categories were connected into bigger and more general, major categories and themes. Identified main themes are: "transmission", "what is Ebola disease", "challenges for health care". They were derived from aims and purpose of the research as well as research question. In the end all category system was revised. The researchers described the meaning of each category, gathered new insights and prepared relevant citations.

## 4 Results

### 4.1 Students' knowledge about Ebola Virus Disease

Generally, students had a rough idea about the disease. There were respondents who knew the exact meaning of the disease pointing out being a deadly virus, knowing transmission modes and the geographical area of infection. Others stated briefly that it is a virus or a media thing, while the rest did not know what the disease is. As one interviewee stated:

*Heard about it, was a deadly disease, but what exactly it was, I don't know, I knew it was a big epidemic in African countries*

A common view amongst interviewees was that Ebola virus and animals are the cause of the disease, whilst others stated that the cause is a parasite or unknown. CIA and media (conspiracy theory) were also seen as causes of Ebola by some students. Students were also able to enumerate symptoms of EVD. They indicated a range of replies, among which fever and bleeding were the most common symptoms. Other symptoms such as diarrhea, vomiting, rash, sweating, pain were mentioned, as well. None of students could name all the symptoms. Taken together, these results suggest that students have some knowledge about Ebola disease, so how do they perceive their own knowledge about this issue? It seemed that all the nursing students wanted to know more about EVD. There were students that expressed their knowledge to be not enough. It appeared that interviewees seemed to hope for more knowledge on how to prevent the disease or successfully fight against it.

One interviewee alluded to the notion:

*My knowledge of Ebola is limited. I think I need to know more about the causes of the disease and how we can prevent it.*

## **4.2 Students' knowledge about modes of transmission of Ebola virus**

The participants demonstrated different levels of knowledge about transmission modes of Ebola and how to protect themselves against the disease. There were students who knew exactly how the disease can be transmitted. They mentioned the transmission modes and went further to explain how this happens. The explanations included body contact with infected person, saliva, sex, feces, blood transfusion, improper aseptic skills, lack of personal protective equipment. They also had an idea of how it is transmitted but did not add any details. There were also students that did not know anything about the modes of transmission. Contact with body fluids such as blood, sweat, human feces, was commonly mentioned among respondents. However, not all respondents mentioned the whole list of the modes of transmission. The most common mode of transmission mentioned was body fluids. Surprisingly, some responses included air as one of the transmission modes.

Students were also able to indicate how health care providers can protect themselves while taking care of the Ebola patients. A range of means was elicited. They mentioned protective clothing (full protective suit, masks, apron, gloves, gumboots covering of the head) and hand hygiene. Only one student did not know how to protect oneself against Ebola. Talking about this issue an interviewee said:

*Face masks, gloves, protective suits.*

### 4.3 Challenges about the disease according to interviewees

Most of the participants indicated that high mortality rate and fast speed of spreading the virus as the biggest challenges for health care concerning EVD. One respondent answered “not many”. The students also saw a challenge in finding health care providers who are not afraid of being infected when trying to give care. The students also reported that other challenges include: countries’ precondition; low levels of education and lack of vaccines. As one student answered:

*It is transmitted quickly & easily, it does not have a cure, lack of proper information/knowledge about the disease. The victims die within a very short period of time*

A group of respondents suggested that the media has exaggerated the information about the spread of the disease. They also stated that Africa is made of 54 countries and only few were affected. As one individual stated:

*Not all African countries had Ebola it's only the western African part which had the disease, you should know that in case you came for example in eastern part of Africa you could not acquire the disease.*

Other respondents reported that there is 0 % risk of acquiring the disease when travelling to Africa. Although students were aware of the main challenges for fighting Ebola epidemics, they usually do not worry about travelling to Africa. They stated that one can get it only if you travel to the countries where the virus is active. They were convinced that the disease has already been controlled in Africa. It was pointed out that it is just a perception in the Western countries that the disease is in the whole Africa. On the other hand, a group of students

stated that they would not travel to Africa. Talking about this issue an interviewee said:

*The symptoms of Ebola cannot be seen by naked eye, thus sitting next to infected people would be a risk of spreading the virus.*

## 5 Discussion

### 5.1 Discussion of key findings

A qualitative approach was used to find out the knowledge of International nursing students on Ebola Virus Disease. There is a need to improve education delivery among nursing students to ensure that they are well educated about the Ebola Virus Disease (Aung et al. 2015). This study revealed that while the knowledge of the Ebola Virus Disease was good in general, there were disturbing gaps in knowledge regarding the cause, modes of transmission and symptoms of the disease. Brand et al. (2014) suggested that since the treatment and preventive measures of EVD are still being researched on, health practitioners should aim at being vigilant and acquiring knowledge about its epidemiology, symptoms, prevention and spread. As an example, a misperception was that Ebola can be transmitted by air. As Rübsamen et al. (2015) suggested, misperceptions could result as inappropriate behavior changes and stigmatization.

Generally, the students did not worry about traveling to Africa and it was seen as a perception of western countries that EVD is in the whole Africa. As mentioned, the students knew the main challenges for fighting Ebola. However, a group of students stated that they would not travel to Africa or if so, travel advice should be available. According to Alqahtani et al. (2014), pilgrims who

had received EVD travel advice were more informed than those who didn't. Pre-travel health care advice was carried out and it showed positive results among the people who attended it and precautions were practiced to reduce the risk factors of contracting the disease (Alqahtani et al. 2014.)

The results of this study revealed that all the nursing students wanted to know more about Ebola Virus Disease and there were students that expressed that their knowledge was not enough. It appeared that students were hoping for more information about the disease prevention and the way to end the virus completely. It must be ensured that the students will get the necessary information easily. Raising awareness instead of fear could be relevant from the perspective of health care providers and students that are in the front line dealing with the patients and disease control.

As previous study (Aung et al. 2015) showed there existed a significant relationship between the knowledge and perception of EVD that was also observed among the students. According to the study, the more knowledge the students had, the more positive their perception about EVD was. With a positive perception, there was more involvement in the curative and preventive measures as directed by the communities and hospitals. This implies that nurses and nursing students should be educated about emerging disease like EVD to reduce misconception, change the negative perception and improve the willingness of nurses to participate in disease control activities, (Aung et al. 2015).

## **5.2 Credibility, Transferability and Dependability**

In order to determine the trustworthiness and authenticity of a study several determinants are used. (Kumar, 2011, 184-186). Trustworthiness in a qualitative

research is established by credibility, transferability, dependability and conformability. In a qualitative research, establishing the credibility of the research involves the participants judging whether or not the research was able to express their opinions and feelings accurately. In order to establish the credibility of the study, the findings of the study will be sent back. Kumar (2011,172) define transferability as the degree to which the outcome of a research can be transferred or generalized to other settings or context. This can be achieved if the adopted process is carefully and broadly described. This includes a clear description of the culture and context, the selection and characteristics of the participants, data collection and the process of analysis. Graneheim and Lundman (2003, 105-112). This research accurately outlined all the different sections of the study.

Dependability is concerned with whether the same results will be obtained if the research was done again (Kumar 2011, 186). According to Graneheim and Lundman (2003, 110), when data is extensive and the collection extends over time, there is a risk of inconsistency. In order to avoid this and make the study more dependable, questionnaires were filled in and immediately after that, the analysis of the collected data was done.

### **5.3 Ethical considerations**

In order to fulfill a qualitative research and analysis of obtained data, it is necessary that the researcher considers the ethical issues regarding the process of conducting the study. The researcher should consider how the findings will be used and how the participants will react to the findings. The participants should feel free to comment on the findings and results. The major principals associated with ethical considerations are respecting the privacy, anonymity, confidentiality, gaining informed consent and avoiding any misinterpretation.

(Schutt, 2015;353-354; Lichtman, 2013, 54-58.) Any individual participating in a qualitative research is entitled to expect that their shared information is guarded and will be treated in a confidential manner. The participants might also be concerned whether their identity will be revealed or not. Also the target groups coming from a vulnerable position must be advocated by the researcher so that their privacy would be respected. (Houghton, 2010; Schutt, 2015;353-354; Lichtman, 2013, 54-58.) In this regard, the respondents were asked to fill questionnaire without stating their personal identity and they were assured that the collected data would not be left out for anyone to view. And after the completion of the study, the collected data was destroyed. The respondents were informed about the study and its goals. The participants had a right to choose whether to participate in the study or not. There was no pressure on them by researchers, peers or superiors.

It is the researcher's responsibility to ensure that participants are informed about the nature of study. (Lichtman, 2013, 54-58.) An explanation of what the research is and how it would be published was given to the target group. The respondents were informed about their right to reject taking part in the study. As a result of this process, the answered questionnaire was considered as an informed and autonomous decision from the participants. The results were supported by scientific evidence, so that other readers could decide to what extent the study is trustworthy.

## **5.4 Conclusions and recommendations for further studies**

The aim of this study was to find out the knowledge of nursing students about Ebola Virus Disease and determine to what extent they are educated about



such a fatal epidemic. Nurses as the largest part of healthcare staff play a significant role in controlling the fatal effects of EVD.

In this study it was observed that there was a knowledge gap among the informants. By studying the responses, it is evident that there is an enthusiasm of learning more about all aspects of EVD. The main concern of the respondents relates to providing health care services to the affected patients. Conducting such studies that target the evaluation of students' knowledge about epidemic diseases could result in improvement of their role in their future working life. It also identifies the need for improvement of education delivery methods in nursing schools. By having holistic information respecting all different aspects of epidemic diseases, the nurses, as the majority number of staff involved in health care sector, can provide an effective response during epidemic outbreaks. Moreover, if the students receive thorough knowledge about epidemic diseases during their study time, they can participate in general education of the society so that during an outbreak the amount of losses will be reduced. In this concern, it is recommended that the nursing department of JAMK University of Applied Sciences add a separate course in the format of case studies to deepen the understanding of nursing students regarding a wide range of epidemic and tropical diseases.

This study can be used as a basis for further research that could be conducted to explore the knowledge of EVD among nurses in other parts of the world. Other researchers conducting studies related to this topic can use this study as a point of reference.

## References

- Alqahtani, A.S., BinDhim, N.F., Booy, R., Heywood, A.E., Rashid, H., Tashani, M., Wiley, K.E. & Willaby, H.W. 2015. Australian Hajj pilgrims' knowledge, attitude and perception about Ebola, November 2014 to February 2015. Vol. 20, 12. 26 March 2015. Accessed on 16 September 2015. <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=21072>.
- Anuska, Ferligoj, Mrvar, A. Development in applied statistics, Open ended vs. closed ended questionnaire, Metododiski Zvezki 19 Ljubljana, 2003. Accessed on 20 November 2015. <http://www.stat-d.si/mz/mz19/reja.pdf>.
- Aung, H.M., Myint, O.W., Lynn, K.K., Mya, K.M. 2015. Knowledge and perception towards Ebola Virus Disease among nursing students in the University of Nursing, Yangon. Accessed on 21 December 2015. [http://www.academia.edu/17302971/Knowledge\\_and\\_perception\\_towards\\_Ebola\\_Virus\\_Disease\\_among\\_nursing\\_students\\_in\\_the\\_University\\_of\\_Nursing\\_Yangon](http://www.academia.edu/17302971/Knowledge_and_perception_towards_Ebola_Virus_Disease_among_nursing_students_in_the_University_of_Nursing_Yangon).
- Brand, J.E, Siela, D., Caine, V.A., Dearth, S. 2014. Vol 9 (10). Ebola is here: Knowledge, identification, and appropriate infection control are key. Accessed on 20 September 2015. <http://www.americannursetoday.com/ebola-knowledge-identification-appropriate-infection-control-key/>.
- Braun, V., Clarke, V. 2006. Using thematic analysis in psychology. Qualitative research in Psychology, 3: 77-101.
- Brikci, N., Green, J. 2007. A guide to Using Qualitative Research Methodology. Medecins Sans Frontieres.
- Carman, K.G., Pollard, M., Parker, A.M. 2015. How the Public Perceives Ebola Risk in the United States. Accessed on 24 September 2015. <http://www.rand.org/blog/2015/03/how-the-public-perceives-ebola-risk-in-the-united-states.html>.
- Centre of Disease Control and Prevention. About Ebola virus disease. Accessed on 19 April 2016. <http://www.cdc.gov/vhf/ebola/about.html>
- Ebola virus disease. Article on WHO. Accessed on 5 November 2015. <http://www.who.int/mediacentre/factsheets/fs103/en/>.

Ebola Virus: Film reveals scenes of horror in Liberia. Video on BBC News. Published on Oct 25, 2014, Accessed on November ,2015.  
<https://www.youtube.com/watch?v=RUuRqa-XU8A> Gabriel Gatehouse.

Ebola: Mapping the outbreak, BBC news. Accessed on 22 February 2016.  
<http://www.bbc.com/news/world-africa-28755033>.

Ebola: US restricts airport arrivals from West Africa. 2014. Article on BBC News on 22 October 2014. Accessed on 10 November 2014.  
<http://www.bbc.com/news/world-us-canada-29719240>

Farrokhi, F., Mahmoudi-Hamidabad A. 2012. Rethinking Convenience Sampling: Defining Quality Criteria Theory and Practice in Language Studies, Vol. 2, 4, 784-792.

Fereday, J., Muir-Cochrane, E. 2006. Demonstrating Rigor Using Thematic Analysis: A Hybrid Approach of Inductive and Deductive Coding and Theme Development.

Ferligoj, A., Mrvar, A. 2003. Development in applied statistics, Open ended vs. closed ended questionnaire, Metodolodiski Zvezki 19 Ljubljana, 2003. Accessed on 19 April 2016.  
<http://www.stat-d.si/mz/mz19/reja.pdf>.

Graneheim, U., Lundman, B. 2003. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. Nurse education today. 105–112. International journal of qualitative methods 5 (1) March 2006.

Gupta, N., Mehta, N., Gupta, P., Arora, V., Setia, P. 2015. Knowledge regarding Ebola Hemorrhagic Fever among private dental practioners in Tricity, India: A cross sectional questionnare study. Niger Med J. 2015 Mar-Apr; 56(2): 138–142. Accessed on 23-March 2016.  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4382605/>.

Houghton E., Catherine, C. Dymrna, David Shaw, Murphy, K. 2010. Ethical challenges in qualitative research: examples from practice. Accessed on 19 April 2016.  
<http://journals.rcni.com/doi/pdfplus/10.7748/nr2010.10.18.1.15.c8044>.

JAMK information. Accessed on 20 November 2015 on  
<http://www.jamk.fi/en/JAMK-information/About-JAMK>

Kumar, R. 2011 Research Methodology: a step- by- step guide for beginners. 3rd Rev. Ed. Sage Publication.

Levine M., Tapia M., Hill A., Sow S. 2014. How the Current West African Ebola Virus Dis-ease Epidemic Is Altering Views on the Need for Vaccines and Is Galvanizing a Global Effort to Field-Test Leading Candidate Vaccines. *Journal of Infectious Diseases Advance*. Accessed on 19 April 2016.  
<http://jid.oxfordjournals.org/content/early/2014/10/14/infdis.jiu513.full.pdf+html>.

Levine, M., Tapia, M. & Hill, A. 2014. How the current West African Ebola virus disease epidemic is altering views on the need for vaccines and is galvanizing a global effort to field-test leading candidate vaccines. *Journal of infectious diseases advance access*. Oxford university press.

Liberia: spreading the word about Ebola through music, 2014. Article on WHO. Accessed on 19 April 2016.  
<http://www.who.int/features/2014/ebola-through-music/en/>.

Lichtman. M. 2013. Chapter 3. Ethical Issues in Qualitative Research, *Qualitative Research in Education A User's Guide*. Accessed on 8 -March 2016.  
[http://uk.sagepub.com/sites/default/files/upm-binaries/27011\\_4.pdf](http://uk.sagepub.com/sites/default/files/upm-binaries/27011_4.pdf).

LoBiondo-Wood, G., Haber, J., Cameron, C. 2013. *Nursing Research in Canada: Methods, Critical Appraisal, and Utilization*, a division of Lead Elsevier Canada.

Lyberg Biemer, Collins, De leeuw, Shwarz, D., Trewin. *Survey measurement and process quality* (pg. 2010), JohnWiley&Sons, Inc 1997. Accessed on 2 February 2016.  
<http://onlinelibrary.wiley.com/doi/10.1002/9781118490013.ch8/pdf>.

Mack, N., Woodsong, C., Macqueen, K.M., Guest, G., Namey, E. 2011. *Qualitative research methods*. Accessed on 22 February 2016.  
<http://www.fhi360.org/sites/default/files/media/documents/Qualitative%20Research%20Methods%20-%20A%20Data%20Collector's%20Field%20Guide.pdf>.

Marmon, B. 2014. The real Ebola threat. Accessed on 28th September 2015.  
<http://nationalinterest.org/blog/the-buzz/the-real-ebola-threat-11483>.

Moghadam., S.R.J., Omid, N., Bayrami, S., Moghadam, S.J., SeyedAlinaghi, S.A. 2015. A review literature. *Asian Pacific Journal of Tropical Biomedicine*.

Elsevier. Vol 5(4). 260-267. Accessed on 19 April 2016. <http://www.sciencedirect.com/science/article/pii/S2221169115303415>.

Monash University. 2009. Writing your data analysis. Accessed on 19 April 2016. <http://www.monash.edu.au/lls/html-Word2.php?file=/lls/hdr/write/5.8.html&printable=true>.

NHS, 2015, Ebola virus disease. Accessed on 10<sup>th</sup> March 2016. Retrieved from <http://www.nhs.uk/conditions/ebola-virus/Pages/Ebola-virus.aspx>.

Olowookere, S.A., Abioye-Kuteyi, E.A., Adepoju, O.K., Esan, O.T., Adeolu, T.M., Adeoye, T.K., Adepoju A.A., Aderogba, A.T. 2015. Knowledge, Attitude, and Practice of Health Workers in a Tertiary Hospital in Ile-Ife, Nigeria, towards Ebola Viral Disease. Journal of Tropical Medicine Vol 2015, 1-6. Accessed on 23 March 2016.

<http://www.hindawi.com/journals/jtm/2015/431317/>

Oxford University, 2016, Ebola Viral disease found primarily in Central Africa and Sudan. Accessed on 10 March 2016. <http://www.oxfordreference.com/view/10.1093/acref/9780195337709.001.0001/acref-9780195337709-e-1330>.

Pew Research Center. 2016. Open and Closed-ended Questions. 1615 L Street, NW, Suite 800 Washington, DC 20036. Accessed on 19 April 2016. <http://www.people-press.org/methodology/questionnaire-design/open-and-closed-ended-questions/>.

Qualitative research in nursing. 2013. Article on Nursing Research nursing research and re-view articles. Accessed on 1 November 2015. [http://nursing-planet.com/research/qualitative\\_research.html](http://nursing-planet.com/research/qualitative_research.html).

Reja, U., Manfreda, K.L., Hlebec, V., Vehovar, V. 2003. Open-ended vs. close-ended questions in web questionnaires. Metodološki zvezki, 19, Ljubljana: FDV, 2003. Accessed on 8 February 2016. <http://www.stat-d.si/mz/mz19/reja.pdf>

Ritchie, J., Lewis, J. 2003. Qualitative Research Practice. A Guide for Social Science Students and Researchers. SAGE Publications. Accessed on 19 April 2016. [https://mthoyibi.files.wordpress.com/2011/10/qualitative-research-practice\\_a-guide-for-social-science-students-and-researchers\\_jane-ritchie-and-jane-lewis-eds\\_20031.pdf](https://mthoyibi.files.wordpress.com/2011/10/qualitative-research-practice_a-guide-for-social-science-students-and-researchers_jane-ritchie-and-jane-lewis-eds_20031.pdf).

Rübsamen, N., Castell, S., Horn, J., Karch, A., Ott, J.J., Raupach-Rosin, H., Zoch, B., Krause, G., Mikolajczyk, R.T. 2015. Ebola risk perception in Germany, 2014. Vol 21 (6) June 2015. Accessed on 29th March 2016.  
[http://wwwnc.cdc.gov/eid/article/21/6/15-0013\\_article](http://wwwnc.cdc.gov/eid/article/21/6/15-0013_article)

Saaranen-Kauppinen, A., Puusniekka, A. 2006. 6.2 Aineiston määrä ja tutkittavat. KvaliMOTV-menetelmäopetuksen tietovaranto verkkojulkaisu. Yhteiskuntatieteellinen tietoarkisto. Accessed on February 2016.  
[http://www.fsd.uta.fi/menetelmaopetus/kvali/L6\\_2.html](http://www.fsd.uta.fi/menetelmaopetus/kvali/L6_2.html).

Saeed Reza Jamali Moghadam , Negar Omid, Samaneh Bayrami, Sepideh Jamali Moghadam, SeyedAhmad SeyedAlinaghi, 2015. Ebola viral disease: a review literature review, Tehran University of Medical Sciences. Accessed on 12 February 2016.  
<http://www.sciencedirect.com/science/article/pii/S2221169115303415>.

Sargeant, J. 2012. Qualitative Research Part 2: Participants, Analysis and Quality Assurance. Journal of Graduate Medical Education, Vol 4(1):1-3  
 Schieffelin, J.S., Saffer, J.G., Goba, A., Gbakie, M., Gire, S.K., Colubri, A., Sealfon, R., Kanneh, L., Moigboi, A., Momoh, M., Fullah, M., Moses, L.M., Brown, B.L., Andersen, K.G., Winnicki, S., Schaffner, S.F., Park, D.J., Yozwiak, N.L., Jiang, P., Kargbo, D., Jalloh, S., Fonnies, M., Sinnah, V., French, I., Kovoma, A., Kamara, F.K., Tucker, V., Konuwa, E., Sellu, J., Mustapha, I., Foday, M., Yillah, M., Kanneh, F., Saffa, S., Massally, J.L.B., Boisen, M.L., Branco, L.M., Vandi, M.A., Grant, D.S., Happi, C., Gevaio, S M., Fletcher, T.E., Fowler, R.A., Bausch, D.G., Sabeti, P.C., Khan, H., Garry, R.F. 2014. Clinical illness and outcomes in patients with Ebola in Sierra Leone. The New England journal of medicine. Vol. 371, 22. 2092-2100. Accessed on 16 November 2015.  
<http://www.nejm.org/doi/full/10.1056/NEJMoa1411680#t=articleTop>.

Schutt k. Schutt. 2015. Investigating the Social World The Process and Practice of Research, reviewed electronic version. Qualitative Data Analysis. Ch. 11, 8th Ed. Accessed on 23 February 2016.  
[http://www.sagepub.com/sites/default/files/upm-binaries/43454\\_10.pdf](http://www.sagepub.com/sites/default/files/upm-binaries/43454_10.pdf).

Siniscalco M. T., Auriat N. 2005. Questionnaire design. Quantitative research methods in educational planning. pp. 3-4

Snapsurveys. Accessed on 9 January 2016. <http://www.snapsurveys.com/survey-software/paper-surveys/>.

Taanila, A. 2012. Otantamenetelmä. Akin menetelmäblogi. Last accessed on 8 February 2016.

<https://tilastoapu.wordpress.com/tag/harkinnanvarainen-nayte/>.

The globe and mail. 2014. Personal protective equipment for health-care workers. Accessed on 20 December 2014.

<http://www.theglobeandmail.com/life/health-and-fitness/health/personal-protective-equipment-for-health-care-workers/article21078672/> .

Thomas D., R. 2006 Analyzing Qualitative Evaluation Data. American Journal of Evaluation. Vol. 27. No. 2. p. 237-246.

Wang, L., Yang, G., Jia, L., Li, Z., Xie, J., Li, P., Qiu, S., Hao, R., Wu, Z., Ma, H., Song, H. 2015. Epidemiological features and trends of Ebola virus disease in West Africa, Vol. 38. Accessed on 1 March 2016. <http://www.sciencedirect.com/science/article/pii/S1201971215001848>.

WHO, Ebola virus disease, 2016. Accessed on 10th March 2016. <http://www.who.int/mediacentre/factsheets/fs103/en/>.

Why Ebola is so dangerous, BBC news on 8 October 2014. Accessed on 19 April 2016. <http://www.bbc.com/news/world-africa-26835233>.

## **Appendices**

### **Appendix 1. Letter of information.**

Dear, JAMK

Letter of information

We are Bachelor Degree students of Jyväskylä University of Applied Sciences and studying degree program in Nursing. We are writing our Bachelor's thesis on the topic "The perception of Ebola Virus Disease among JAMK nursing students, Jyväskylä". The objective of this study is to find out the perception of EVD among nursing students in Jyväskylä University of Applied Sciences. We will conduct the interviews in 2016. Participation is strictly voluntary and there

are no risks to participate in the study. Participants are free to withdraw any-time and they are not obliged to answer any questions they find objectionable or which make them feel uncomfortable. Information obtained from participants will be used purposely for this study and participants' confidentiality is guaranteed. Participants may contact the researchers or the head of Department of Nursing if they have any question, concerns or complaints about the research procedures.

## **Appendix 2. Questionnaire**

1. In your own words, explain what ebola disease means.
2. How can health care providers protect themselves while taking care of the patients?
3. Could you point out Ebola disease symptoms?
4. What are the modes of transmission of the disease?
5. What are the causes of Ebola disease?
6. What are the challenges for fighting this epidemic?
7. If you consider the most recent worldwide situation about Ebola: what do you think about personal risk of acquiring Ebola by traveling to African countries?
8. Do you think your knowledge about Ebola virus is enough? What kind of information do you think you need?